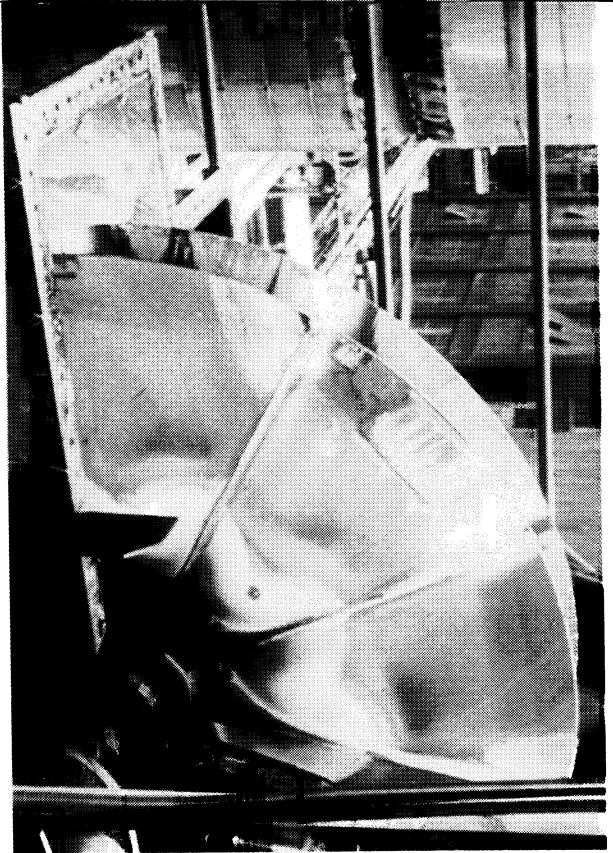


## Equipment Failure Analysis

The NASA-developed computer program NASTRAN® (NASA Structural Analysis) is widely used in industry as an aid in designing new systems. Available to industry through NASA's Computer Software Management and Information Center (COSMIC)®, located at the University of Georgia, NASTRAN electronically analyzes a design and predicts how it will stand up under various stresses and strains. One company—Tennessee Eastman Company, Kingsport, Tennessee—is employing NASTRAN in somewhat different fashion; as a failure analysis tool for production equipment used to turn out the company's line of fibers, chemicals and plastics.

Tennessee Eastman—part of the Eastman Chemicals Division of Eastman Kodak Company—uses NASTRAN to minimize lost production by pinpointing the causes of equipment failures and preventing recurrences. An example of the program's utility involves the large centrifugal fan shown at right, which developed cracks. Analysis showed that damage was occurring during start-ups and shutdowns, information that prompted redesign of the fan. Identification of the trouble brought a recommendation that the fan be allowed to run continuously, permitting uninterrupted production until the new fan could be built.

In another application, NASTRAN was used to predict difficulties that might be encountered in adding a planned 50-foot extension to a 100-foot stack (below). Analysis showed that the extension would generate unacceptable loads on the foundation and cause troublesome stack vibrations during high velocity winds. NASTRAN's investigation thus prevented installation of a potentially dangerous



structure whose failure could have caused significant production losses. Tennessee Eastman has made extensive use of NASTRAN, both as a failure analysis tool and as an aid to redesigning production hardware. The company reports that NASTRAN analyses have eliminated many initial and repeated failures, providing substantial reduction in maintenance costs and lost production.

\*NASTRAN and COSMIC are registered trademarks of the National Aeronautics and Space Administration.

